

Pollution Prevention Opportunities for Formulators

The keys to pollution prevention in formulation are better scheduling to minimize changeover, finding alternative cleaning methods to minimize waste generation, and avoiding the use of chlorinated solvents.

<u>Y/N</u>	<u>Opportunities</u>	<u>Comments</u>
I. Material Handling and Storage		
___	Control inventory	Do not allow material to exceed shelf life and then have to be discarded as waste. Use materials on a first-in, first-out basis. Do not get rid of expired products by discharging to wastewater treatment system.
___	Reduce use of containers	Fewer containers means less water will be required for triple rinsing. Have suppliers deliver materials in tank trucks directly to on-site storage tank.
___	Buy appropriate amounts	Buy materials in small quantities if only small amounts are required. Savings on large quantity purchases can be lost if unused material must be disposed or is discharged to laboratory sink drains.
___	Manage laboratory samples	Do not allow concentrated lab samples to be discharged to wastewater treatment system.
___	Cover outdoor storage	Divert clean stormwater away from material storage and handling areas.
___	Install spill containment	Spills can be contained and managed appropriately rather than draining to wastewater treatment system and causing system upsets.
II. Rinsing		
___	Use jet sprays with pressure booster pump	Reduces amount of required rinsewater.
___	Use water knife spray	Reduces amount of required rinsewater.
___	Use steam cleaner	Reduces amount of required rinsewater.
III. Material Recycling, Reuse, and Recovery		
___	Install drip pan for filling line	Recover and recycle product to filling reservoir.
___	Reuse mix tank rinsewater	Reuse rinsewater in next process batch.
___	Reuse floor washwater	Treat and reuse as washwater or equipment rinsewater (including empty drum rinsing). Treatment technologies include chemical precipitation, biological treatment, activated carbon adsorption, air or steam stripping, hydrolysis, chemical oxidation, and resin adsorption.

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| _____ Reuse container rinsewater | Treat and reuse both solvent and water rinses for containers |
| _____ Recover materials for reuse from wastestreams using separation technologies | Separate and concentrate materials using membrane separation and evaporative technologies. |
| _____ Collect and reuse stormwater | Reuse as floor washwater. |
| IV. Process Modification | |
| _____ Use continuous processes | Batch processes involve more frequent mix tank cleaning. |
| _____ Use pumps and pipes | For raw material and product transfer, use closed systems as much as possible. Reduces potential for spills. |
| _____ Segregate waste streams | Increases recovery potential and treatment efficiency. Segregate water-based streams from solvent-based streams. Reduces amount of solvent to wastewater treatment system. |
| _____ Dedicate equipment | Reduces need for tank rinsing between batches. |
| _____ Optimize inventory and production schedule using computer production. | Minimizes need for changeover and consolidates batch production |
| V. Process Operation and Maintenance | |
| _____ Raw material purity | Use high quality raw materials in batch so batch will not become contaminated and have to be managed as a waste. |
| _____ Use mops and squeegees | For floor washing, mops and squeegees reduce amount of washwater required. |
| _____ Wiper blades on mix tanks | Use wiper blades to physically wipe down sides of mix tanks. Reduces amount of rinsewater required. |
| _____ Spill cleanup procedures | Establish procedures for what to do with a spill. Mitigates chance of spill being discharged to wastewater treatment plant. |
| _____ Perform preventive maintenance | Routinely check for leaks in valves and fittings. Repair immediately. |